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**ABSTRACT**

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An apparatus for processing imaging data in a plurality of spectral bands and fusing the data into a color image includes one or more imaging sensors and at least two image-acquiring sensor areas located on the imaging sensors. Each sensor area is sensitive to a different spectral band than at least one of the other sensor area or areas, and each sensor area will generate an image output representative of an acquired image in the spectral band to which it is sensitive. The apparatus further includes a software program that runs on a computer and executes a registration algorithm for registering the image outputs pixel-to-pixel, an algorithm to scale the images into a 24-bit true color image for display, and a color fusion algorithm for combining the image outputs into a single image. The system architecture and software includes the registration and color fusion algorithms and preferably a color monitor for displaying an operator interface that includes pull-down menus to facilitate a terminal operator carrying out registration and/or adjustment of the scaled and other images on-screen in order to produce a desired color fusion image output.